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Vol. 9, No. 2. WASHINGTON, D.C. September 1939.

Agricultural Engineering.

Applying engineering to southern agriculture. By Paul W. Chapman. Georgia Ag. engineer. v.10,1939. p.18-20.

"Cooperation" the watchword of the agricultural engineer. By Raymond Olney. Georgia Ag. engineer. v.10,1939. p.22-26.

Fundamental role of agricultural engineering: editorial. Implement and machinery review. v.65,no.769. May 1, 1939. p.61-62.

Agriculture.

Agricultural experiment stations in 1938. Experiment station record. v.80,no.6. June, 1939. p.721-724.

As agriculture goes so goes the nation. By Charles R. Morgan. Farm machinery and equipment. No.1864. April, 1939. p.5-6.

Three ages of agriculture. By Joe Tucker. Implement and tractor. v.54,no.16. August 5, 1939. p.16,38.

Air conditioning.

Air-conditioned hay. By Fred A. Wirt. New England homestead. v.112,no.9. May 6, 1939. p.8-9. Oft-repeated tests show most valuable part of hay is the leaves.

Turning temperatures inside out. By E. R. Meacham. Electricity on the farm. v.12,no.6. June, 1939. p.11-12. Big fan brings the cool night air in and kicks warm air out. Lower house temperatures.

Alcohol Fuel.

Government experts oppose 'Alky-gas' subsidy. National petroleum news. v.31,no.22. May 31, 1939. p.26-27.

Brooders, Electric.

Electric brooder facts. Electricity on the farm. v.12,no.3. March, 1939. p.16.

Building Construction.

Anti-trust study of construction to center on housing costs. Engineering news-record. v.123,no.1. July 6, 1939. p.52-54.
Plans of Attorney-General's department for nation-wide investigation of combinations in restraint of trade that affect cost of construction outlined. Study to be centered on mass housing. Practices which Attorney-General believes affect cost of construction enumerated.

Automatic design of continuous frames. By L. E. Grinter. Civil engineering. v.9,no.6. June, 1939. p.345-348.
Criticism of all methods of analysis of continuous framed structures is that designer can seldom afford time necessary for revising preliminary design to agree with theoretical analysis. Basis for such criticism is that tedious process of repeated analysis has been only method available for design of continuous frame. Design process presented takes individual procedures required in older methods and welds them together into single series of successive corrections, not unlike Cross method of moment distribution, that approaches purely automatic method of design. Advantages are important saving of time, fortunate simplicity that permits experienced designer to advance convergence by use of judgment, and automatic feature that results in good design irrespective of inexperienced designer's initial errors of judgment.

Innovations lower slab cost on Red Hook houses. Engineering news-record. v.123,no.1. July 6, 1939. p.50-51.
Considerable saving in floor and roof slab cost by use of twisted bar reinforcement, which has 50 per cent higher permissible working stress, and by use of vacuumized concrete, which cures rapidly.

Modern building code--arrangement and organization. By D. S. Laidlaw. Civil engineering. v.9,no.6. June, 1939. p.338-340.
Article deals with principles of sequence, subdivision numbering, wording, and format, always keeping in mind aims of making contents of code as accessible as possible to users, and providing for future revision and expansion. Presents plan for subdividing and numbering various sections so as to provide for future revision and expansion, and concludes with suggestions on type of organization best suited to work of preparing or revising code.

Number of tile required in a sq. ft. of wall area allowing for ample overage. Brick and clay record. v.94,no.6. June, 1939. p.37.

Steel rigid frame design used for high school. By Arnold A. Weitzman. Engineering news-record. v.122,no.23. June 8, 1939. p.86.

Table for figuring quantities of tile mortar. Brick and clay record. v.94,no.6. June, 1939. p.37.

To figure number of brick for chimneys. Brick and clay record. v.94,no.6. June, 1939. p.37.

Building Materials.

Acoustic properties of various materials. Brick and clay record. v.94,no.6. June, 1939. p.37.

Materials specifications and tests given annual overhauling. Engineering news-record. v.123,no.1. July 6, 1939. p.36-37. Action on specifications and discussions of unexplored properties of materials feature 42nd annual A.S.T.M. meeting.

Research on alloy steels. Engineering. v.147,no.3829. June 2, 1939. p.663-664. Discusses second report of Alloy Steels Research Committee, joint committee of the Iron and Steel Institute and British Iron and Steel Federation reporting to Iron and Steel Industrial Research Council.

Corrosion.

Buried equipment requires protection. By Frank Emery. Southern power and industry. v.57,no.7. July, 1939. p.42-46. Piping and other buried equipment constitute a large investment. Proper installation and protection pay.

Cotton.

Cotton...its problem and proposed solution. By Oscar Johnston. Cotton ginners' journal. v.10,no.9. June, 1939. p.5-6,20,24.

Cotton Gins and Ginning.

Make a power survey--check your power cost now. By Orville Adams. Cotton and cotton oil press. v.40,no.5. February 4, 1939. p.3-4.

Power cost yardstick for ginners. By Orville Adams. Cotton and cotton oil press. v.40,no.6. February 11, 1939. p.3-4.

Present activities in cotton ginning research. By Chas. A. Bennett and F. L. Gerdes. Cotton and cotton oil press. v.39,no.13. March 26, 1938. p.11-12.

Dams.

Conchas Dam and proposed Tucumcari project. Reclamation era. v.29,no.6. June, 1939. p.126-130.

Graphical arch analysis applicable to arch dams: discussion. By I. M. Nelidov. American society of civil engineers. Proceedings. v.65,no.6. June, 1939. p.1078-1080.

Possum Kingdom initiates Brazos development. Engineering news-record. v.122,no.23. June 8, 1939. p.71-75. Flat slab dam of long spans, and first of massive buttress type,

Dams. (Cont'd).

is being built as first step in conserving waters of Texas' largest river. Uses WPA funds but normal contract procedure. Founded on shale. Sliding factor of 0.42 used. Special details to insure cooperative action of deck and buttresses. Special excavation methods to shield shale from air before concrete is placed.

Reconstruction of fruit growers dam. By Stephen H. Poe. Reclamation era. v.29,no.7. July, 1939. p.168-171.

Sardis Dam and reservoir. By Norman R. Moore. Civil engineering. v.9,no.6. June, 1939. p.349-352. Design features of $15,000,000 flood control project in Northwestern Mississippi. Discusses design of project from standpoint of hydrologic, hydraulic, and structural requirements. Author explains basic design assumptions, and frequent references to alternative designs that were tried and found wanting.

Drainage.

Modern drainage and ditching equipment. By S. J. Wright and J. H. Blackaby. Implement and machinery review. v.64,no.766. February 1, 1939. p.993-994.

Electricity on the Farm.

Appraisal of Edison electric institute's statistics on farm electrification. Journal of land and public utility economics. v.14,no.4. November, 1938. p.471-476.

Effect of rural electrification upon farm life. Monthly labor review. v.48,no.4. April, 1939. p.905-910. Table shows, by States, number of organizations to which loans had been granted, amount of loan, miles of line, and customers to be served, as of June 30, 1938.

Electricity aids the poultryman. By Jack Klein. California cultivator. v.86,no.10. May 20, 1939. p.300.

Use of electricity on farms of the Boise and Owyhee projects. By Claude H. Studebaker. Reclamation era. v.29,no.7. July, 1939. p.178-179.

Engineering.

Engineering economics and public works. A symposium: discussion. By Daniel W. Mead and William J. Wilgus. American society of civil engineers. Proceedings. v.65,no.4. April, 1939. p.675-676.

The young engineer facing tomorrow. By William E. Wickenden. Mechanical engineering. v.61,no.5. May, 1939. p.347-348.

Erosion Control.

Beach erosion studies: discussion. By Morris N. Lipp. American society of civil engineers. Proceedings. v.65,no.4. April, 1939. p.757-760.

Beach erosion studies: discussion. By Elliott J. Dent and Ralph F. Rhodes. American society of civil engineers. Proceedings. v.65,no.6. June, 1939. p.1091-1097.

Farm Machinery and Equipment.

Experimental cane harvester. Farm implement news. v.60,no.16. August 10, 1939. p.39. Experimental cane harvester has been built by R. G. LeTourneau, Inc., Peoria, Ill., and will be field tested in company with motorized fabricating shop installed in motor truck. Harvester is mounted on pneumatics 7-ft. in diameter. Extended frame at rear carries 160 Hp. V-8 Caterpillar Diesel which powers harvester, and engine is direct-connected with electric generator. This supplies energy to individual motors that drive various operating elements, thus avoiding extended mechanical drives and structural bracing therefor.

Farm equipment census. Farm machinery and equipment. No.1864. April, 1939. p.10. Manufacture and sale of farm equipment and related products compared with years 1936 and 1937.

Farm machinery in national defence. Implement and machinery review. v.64,no.768. April 1, 1939. p.1211-1212. £30,000,000 scheme. Vital tractor power. Labour's greater utility.

Information on farm machinery. California cultivator. v.86,no.6. March 25, 1939. p.170-171,174.

Machinery developments needed in southern agriculture. By H. P. Smith. Farm implement news. v.60,no.13. June 29, 1939. p.26-27.

Mechanical thinning of sugar beets. Farm implement news. v.60,no.13. June 29, 1939. p.23. Tests with different types of planters showed that "the pick-up cup or cell type of mechanism seemed to show most promise." Tests show that percentage stands of plants with single-seed planter increased from 30 percent when 5 pounds of seed was used to acre to 73 percent when 20 pounds was used. For conventional planter corresponding percentages were 26 and 59. Single-seed planter produced half again as many single seedlings as did conventional planter.

More power to the farm. By E. Crawford Smith. Southern agriculturist. v.69,no.4. April, 1939. p.4.

New farm implements. By Harry G. Davis. Southern planter. 100th yr.,no.3. March, 1939. p.5,18.

Farm Machinery and Equipment. (Cont'd).

Ploughing and re-seeding: work and the implements. By H. I. Moore. Implement and machinery review. v.65,no.770. June 1, 1939. p.184-186.

Recent improvements in farm machinery and the effect on home food production. Implement and machinery review. v.64,no.768. April 1, 1939. p.1212-1214. Dependence on the tractor. Wider scope suggested. Essentials of complete mechanisation.

Single-seed beet planter. Implement and machinery review. v.64,no.766. February 1, 1939. p.998-999.

Then and now. By B. D. Moses. California cultivator. v.86,no.6. March 25, 1939. p.155,179. Discussion of history of farm machinery.

Feed Grinders and Grinding.

Electric feed grinders. By R. U. Blasingame. Pennsylvania farmer. v.119,no.14. December 31, 1938. p.3,17. Principal advantages of automatic electric feed grinder are: 1. Reduces overhead on equipment. 2. Employs machine designed expressly for small motor drive. 3. Automatic feature reduces labor required to do grinding. 4. It can be adjusted to most any type structure due to features whereby grain on ground feed can be elevated into overhead bins.

Fertilizer Placement.

Irish potato fertilizer placement demonstrations North Carolina 1938. By Lewis P. Watson. Market growers journal. v.64,no.8. April 15, 1939. p.206.

Fertilizers.

Complete composition of commercial mixed fertilizers. By Frank O. Lundstrom and Arnon L. Mehring. Industrial and engineering chemistry. Industrial ed. v.31,no.3. March, 1939. p.354-361.

Effect of various grades of fertilizers on the salt content of the soil solution. By Lawrence M. White and William H. Ross. Journal of agricultural research. v.59,no.2. July 15, 1939. p.81-99. Purpose of investigation was to develop laboratory method for measuring influence of fertilizers on concentration of soil solution with view to determining whether danger from salt injury is being increased or decreased by changes taking place in composition of fertilizers. Work was limited to study of ordinary fertilizer materials and mixtures which are considered to be non-toxic to plants below concentration that produces plasmolysis in ordinary cultivated crops.

Fire Protection.

Fire protective construction on farms. By Wallace Ashby. Journal of American insurance. v.16,no.3. March, 1939. p.13-16.

Valuable for fire protection. Farm machinery and equipment. No.1864. April, 1939. p.9. Stresses electric water systems as means of fighting farm fires.

Floods and Flood Control.

Flood control of the Mississippi River. By Harley B. Ferguson. Civil engineering. v.9,no.6. June, 1939. p.353-354. Historical review.

Flood-protection data progress report of the committee: discussion. By Edgar E. Foster and C. D. Curran. American society of civil engineers. Proceedings. v.65,no.4. April, 1939. p.748-756.

Flood-protection data progress report of the committee: discussion. By Charles S. Bennett. American society of civil engineers. Proceedings. v.65,no.6. June, 1939. p.1101-1102.

Floors.

Factory floors in the chemical and related industries. By Reuel C. Stratton and Warren A. Hough. Industrial and engineering chemistry. Industrial ed. v.31,no.3. March, 1939. p.283-289. Problem is to specify for industry a floor which, at reasonable cost for installation and maintenance, will provide resistance to chemical attack, resistance to mechanical and physical deterioration, employee safety and comfort, and long service with minimum of interruption for repair and replacement.

Floors for industrial purposes. By R. Fitzmaurice and F. M. Lea. Structural engineer. v.17(new series),no.5. May, 1939. p.258-273,277. Resistance to impact and abrasion. Resistance to chemical attack. Comfort. Changes in volume. Appearance. Strength. Durability. Sound transmission.

Flow Meters.

New trends in rate-of-flow measurement. By Kermit Fischer. Instruments. v.12,no.7. July, 1939. p.185-198.

Relations involved in metering rate-of-flow. By Ed S. Smith, Jr. Instruments. v.12,no.4. April, 1939. p.115-126. Prandtl-Tietjens relation between pressure and velocity. Conservation of energy: potential and kinetic energy. Graphical correlation of coefficients and expansion factors against the Reynolds Number and the Acoustic ratio. Reaction of nozzle jets. Borda's law of momentum changes at an increase of section.

Flow of Water and Gases.

Solving pipe flow problems with dimensionless numbers. By A. A. Kalinske. Engineering news-record. v.123,no.1. July 6, 1939. p.55. In solving pipe flow problems for any fluid plotting of friction factor f against Reynolds' number is used. But if either discharge or diameter is unknown solution is trial and error process. Article shows development and use of two other dimensionless numbers which eliminate trial and error methods of solution.

Frost Protection.

Frost protection of ferns by sprinkler irrigation. By Ray T. Sherouse. Monthly weather review. v.67,no.3. March, 1939. p.61-62. Experiments conducted by Florida Horticultural Protection service have shown that it is possible to protect certain ground crops from frost damage against severely low temperatures by sprinkler irrigation. Observations as to effectiveness of this method of frost protection are presented in discussion.

Fuels.

Fundamental principles and value of fuel testing. By Alan S. Bean and Joseph Brown. Engineering. v.147,no.3829. June 2, 1939. p.662-663. Foundation of fuel testing is sampling. Unless this is properly carried out, results obtained and interpretations made from them are waste of time and energy.

Heating.

Design of vapor heating for a seven room residence. By Raymond B. Mitchell. Georgia Ag. engineer. v.10,1939. p.58-64.

Downdraft conversion burner for domestic furnaces. By Julian R. Follows. Mechanical engineering. v.61,no.4. April, 1939. p.278-280.

Hitches.

New automatic plow hitch. Farm implement news. v.60,no.13. June 29, 1939. p.25.

Hotbeds and Cold Frames.

Double hotbed sash frames. By Ernest Chabot. Rural New-Yorker. v.98,no.5448. April 8, 1939. p.211. Gives cross section and construction details of a double hotbed sash frame.

Electric hot beds. By R. U. Blasingame. Pennsylvania farmer. v.120,no.2. January 28, 1939. p.69.

Hydraulics.

Friction in hydraulic models. By Thomas DeF. Rogers. Civil engineering. v.9,no.6. June, 1939. p.367.

Hydraulics. (Cont'd).

Hydraulic model design--distortion of scale. By Herbert D. Vogel. Military engineer. v.31,no.177. May-June, 1939. p.187-188.

Hydrology.

Hydrology of the Great Lakes. A symposium: discussion. By A. A. Young. American society of civil engineers. Proceedings. v.65,no.6. June, 1939. p.1105-1108.

Irrigation.

Advantages of broad-furrow irrigation. By Colin A. Taylor. Pacific rural press. v.137,no.11. March 18, 1939. p.262-263.

Farming irrigated lands. California cultivator. v.86,no.10. May 20, 1939. p.275,299.

Fundamentals of irrigation practice. By George D. Clyde. New agriculture. v.21,no.9. June, 1939. p.10-11.

Get the "Low-down" on irrigation and what it is doing for your state. By Edward L. Dennis. Oregon farmer. v.62,no.8. April 13, 1939. p.3.

Irrigation choice needs study. Oregon farmer. v.62,no.8. April 13, 1939. p.17. Many factors influence type of system.

Irrigation for vegetables. By Paul Work. Market growers' journal. v.64,no.11. June 1, 1939. p.282-285. Sub-irrigation. Porous hose irrigation. Whirling head system. Fixed nozzle type.

Irrigation for vegetables. By Paul Work. Market growers' journal. v.64,no.12. June 15, 1939. p.300-301,307.

Irrigation of alfalfa and small grains in Montana. By G. H. Bingham. Reclamation era. v.29,no.7. July, 1939. p.180,182.

Late irrigation of cane in sub-tropics. By Arthur H. Rosenfeld. International sugar journal. v.41,no.486. June, 1939. p.212.

Overhead irrigation for permanent pastures. By Henry J. Beckman. California cultivator. v.86,no.10. May 20, 1939. p.291,303.

Sprinkler systems for orchards. By J. E. Christiansen. Pacific rural press. v.137,no.11. March 18, 1939. p.254-255. Ideal arrangement of portable undertree sprinkler system for orchards consists of: 1. Centrally located source of supply--usually a well and pump. 2. Stationary main line, or lines, with hydrants at fairly close intervals. 3. Portable laterals of small

Irrigation. (Cont'd).

light weight portable pipe with quick couplings, connected to hydrants with short lengths of hose. 4. Small whirling sprinklers, or stationary spray heads, mounted on laterals, and spaced same distance apart as trees.

Trade possibilities in irrigation. Implement and tractor. v.54,no.16. August 5, 1939. p.14-15,40.

Year around irrigation. By D. J. Whitney. California cultivator. v.86,no.10. May 20, 1939. p.277,293.

Lubrication.

Investigation of insulating oil deterioration. By J. C. Balsbaugh and J. L. Oncley. Industrial and engineering chemistry. Industrial ed. v.31,no.3. March, 1939. p.318-326.
In these investigations of deterioration, usually by oxidation, of electrical insulating oils, major portion of research has been spent in studying and improving existing tests, and in developing additional tests which can be applied to oils of this type. These tests may be grouped into three classes: chemical tests, electrical tests, and physical tests. They involve determination of hydrocarbon type, oxygenated components, both volatile and non-volatile, metallic components, and other components (e.g., sulfur and nitrogen); measurement of direct current conductivity and of power factor and dielectric constant over audio-frequency range; and measurement of light absorption over visible frequency range, viscosity, and state of subdivision in case of colloidal components. Purpose of this paper is to point out, in light of experience obtained in this research, significance and limitations of some of these tests as applied to insulating oils.

Some factors in the lubrication of high-speed diesel engines. By A. T. McDonald. Mechanical engineering. v.61,no.5. May, 1939. p.356-358.

Motor Fuel.

C F R Research method of tests for knock characteristics of motor fuels. S.A.E. journal. v.44,no.6. June, 1939. p.277-280.
This method of test is intended for determining (for research purposes only) knock characteristics, in terms of arbitrary scale of octane numbers, of gasoline and equivalent fuels for use in spark-ignition engines.

Kansas survey of tractor fuels. Implement and tractor. v.54, no.15. July 22, 1939. p.12,24. Summary of general conclusions follows: 1. Fuel cost is approximately one-third of total cost of operating tractor. 2. Nearly 90 percent of tractors in Kansas are of low compression type, designed to burn low-grade fuels, kerosene and distillate. 3. There are many distillates or fuels of fuel-oil class available in Kansas that are satisfactory

Motor Fuel. (Cont'd).

fuels in conventional low compression tractor engine. 4. Low cost and high heat content per gallon are attractive features of distillate as fuel for low compression, spark ignition tractor. 5. Quality of tractor distillates varies widely. 6. Natural color and octane rating of fresh distillate fuel are related. 7. Distillate fuels (from similar crude stocks) containing some cracked stock will have higher octane ratings than 100 per cent straight run distillates, and octane rating is generally almost directly proportional to cracked fraction in fuel. 8. Tractor engines designed to operate on low grade fuels developed their rated power on each of five commercially available fuels, namely, premium, regular and third grade gasolines, kerosene and distillate. 9. High rate of dilution of crankcase oil may be expected when using distillate fuels unless engine temperatures are kept close to boiling. 10. Kerosene and distillate cause more offensive exhaust fumes, are less convenient to handle, and require closer engine adjustment and attention than gasoline. 11. Higher octane distillates tend to give lower fuel consumption and higher thermal efficiencies, particularly at the heavier loads. 12. On engines where water injection is effective as an antidetonant, it may be said that, in general, use of water increases thermal efficiency only when operating at such a load that detonation (without water injection) would have had an intensity greater than "medium." 13. Power of tractor engine is increased and fuel consumption for given load is decreased with use of higher engine compression ratios, but it is necessary to use better grades of gasoline as fuels. 14. Fuel cost of operating tractor engines could not be reduced, by use of 5.65 and 5.75 compression ratios and premium and regular grade gasolines, below that which resulted with distillate and compression ratios between 3.73 and 4.50 with present Kansas fuel price differentials.

Tractor fuel trend is toward gasoline. National petroleum news. v.31,no.24. June 14, 1939. p.30-32. Surveys indicate that farmers, especially in Middle West, are turning more and more to regular grade gasoline as fuel for their tractors. Results of these tractor fuel surveys, which also covers types of lubricants used, are told in article.

Paints and Painting.

Architectural paint problems. By W. W. Castor. Pencil points. v.20,no.7. July, 1939. p.462-468.

Flow properties of paints. By R. W. Kewish and D. F. Wilcock. Industrial and engineering chemistry. Industrial ed. v.31,no.1. January, 1939. p.76-83. Flat wall paints were made according to series of variations in basic formula. Leveling tests were carried out on these paints, and flow properties of paints were measured on a plastometer of the Bingham and Green type and on new kind of thixotrometer. Leveling test simulates conditions of leveling in case of brush-applied paint film. New method of judging extent of leveling is described. Evidence is given for concluding that measurements made with plastometer are indicative of maximum fluidity.

Paints and Painting. (Cont'd).

Fresh paint for the house. Consumers' digest. v.5,no.4. April, 1939. p.36-41.

Moisture peeling of house paints is caused largely by modern construction practices a survey indicates. Agricultural news letter (Du Pont). v.7,nos.6 and 7. June-July, 1939. p.65-66. Conclusions were as follows: 1. Survey of houses indicated that over one half of frame houses in Northeastern part of U. S. show some degree of moisture failure, varying from areas as little as three square inches in some buildings to areas of several square feet in others. 2. Studies based on small test house showed that tar paper placed between sheathing and siding retards but does not stop paint failure resulting from condensation of moisture on interior walls of building. 3. Introduction of tight seal between interior and exterior wall surfaces will reduce and, in some cases, prevent moisture failure of paint due to condensation. 4. Blocking of free air circulation in side walls will permit greater moisture failure. 5. Introduction of external ventilation immediately behind siding prevents failure of paints applied to these exterior wall surfaces. 6. Moisture which is responsible for paint failure may reach wood in one of two ways. First is that ordinarily associated with careless construction. Second is water in vapor form migrating from warm interior of house and condensing against cold exterior portion of wall or clapboards.

Patents.

Patent litigation in 1938. By Nelson Littell. Industrial and engineering chemistry. Industrial ed. v.31,no.1. January, 1939. p.120-123.

Pest Control.

Electrocution of grape leaf folders and grape leaf hoppers. By D. J. Whitney. California cultivator. v.86,no.6. March 25, 1939. p.157,169.

Flies! What can be done about them. By Geo. W. Kable. Electricity on the farm. v.12,no.8. August, 1939. p.13.

Lights turn battle against insect armies. Popular mechanics magazine. v.70,no.6. December, 1938. p.840-843,118A-119A. Electricity is playing a new role in agriculture. It now becomes a destroyer of insect hordes by developing light rays which lure them to their death.

Pipes and Piping.

Estimating labor costs for piping installations. By George E. Deatherage. Heating, piping and air conditioning. v.11,no.6. June, 1939. p.365-367. Classifies methods as percentage method, unit operations costs, and materials plus estimated labor for each line or branch.

Pipes and Piping. (Cont'd).

Preparing the piping estimate. By George E. Deatherage. Heating, piping and air conditioning. v.11,no.4. April, 1939. p.223-225. Indicates importance of proper procedure in making up bill of materials and to show how it is used in determining cost.

Steel pipe for water service. By John W. Lewis. Indian engineering. v.105,no.4. April, 1939. p.129-131.

Plastics.

Protein plastics from soybean products. By George H. Brother and Leonard L. McKinney. Industrial and engineering chemistry. Industrial ed. v.31,no.1. January, 1939. p.84-87. Seventy commercially available plasticizers were tried with formaldehyde-hardened soybean protein. Polyfunctional alcohols gave positive results as plasticizing agents; of these ethylene glycol was best. Primary monohydric alcohols, esters, ketones, and oils gave most definitely negative results. Ethylene glycol improved plastic flow of material apparently as plasticizer. This material may be rendered thermosetting by heating. Ethylene glycol increased water absorption from 10 to 21 per cent. Oleanolic acid and aluminum stearates, in mixture with ethylene glycol, reduced water absorption more than other agents tried.

Research employs plastics. By W. T. Collins. DuPont magazine. v.33,no.3. March, 1939. p.3-5. Models of "Pyralin" cellulose nitrate plastic are useful in hydraulic research work.

Plows and Plowing.

Disk plow. By H. B. Wall. Georgia Ag. engineer. v.10,1939. p.44-47. History and development. Types of machines now on the market. Range of use of the disk plow. Materials used in the construction of the disk plow. Power requirements for different sizes. Future possibilities.

Roturacion de la tierra. Annales de la Sociedad Rural Argentina. v.73,no.2. February, 1939. p.117-119. Plowing the soil.

Will Ford revive the Ferguson plow with his new tractor? Implement record. v.36,no.6. June, 1939. p.17. Details are lacking regarding much discussed accompanying tractor. Incorporates plowing system invented by Harry Ferguson of Belfast, Ireland. Attempts to use Ferguson plow in California agriculture several years ago proved disappointing, but it is understood that Ford's new setup will correct previous failure. It weighs 1700 pounds, and carries plow or other implement, by means of hydraulic lift which keeps implement at constant level as tractor moves forward. It raises or lowers at touch of level by operator. Revolutionary principle lies, in altering "line of draft" through use of two

Plows and Plowing. (Cont'd).

parallel couplings, one above the other, between tractor and plow. The parallel couplings provide pull which never before has been utilized.

Pork- Cutting.

Killing, cutting and curing pork. By E. J. Wilford and Grady Sellards. Lexington, Ky., 1938. 31p. University of Kentucky. College of agriculture. Extension division. Circular no.261 revised.

Production Costs.

Productivity and employment in the beet-sugar industry. Monthly labor review. v.48,no.3. March, 1939. p.564-567. Between 1917 and 1935 productivity of labor in manufacture of beet sugar doubled. No major changes in production methods occurred during this period, but there were numerous minor improvements. Among these was increased application of electricity that made possible use of instruments and devices for facilitating precise control of chemical processes and mechanization of handling operations. Better machine designing and improved modes of coordinating mechanical operations account for part of increased productivity. There were also advances in knowledge of chemistry in application to this industry. Increased volume of production tended to prevent displacement of labor.

Quick Freeze.

New quick-freezing method. Ice and cold storage. v.42,no.495. June, 1939. p.89. "Z" flexible froster described.

Rainfall and Run-off.

Analysis of run-off characteristics: discussion. By LeRoy K. Sherman and others. American society of civil engineers. Proceedings. v.65,no.3. March, 1939. p.511-526.

Reclamation.

America's last frontier--on the Colorado. Arizona farmer. v.18,no.8. June 24, 1939. p.3.

Development of supplemental water for operations on Payette River. Reclamation era. v.29,no.4. April, 1939. p.82.

Economic results of the Lloyd Barrage. By Durgdas B. Adwani. Engineering. v.147,no.3813. February 10, 1939. p.162-163. Scheme has now been in operation for several years, and paper reviews results obtained and so far as is possible, compares these with original forecasts.

Progress of the Central Valley project. By K. C. Adams. California cultivator. v.86,no.10. May 20, 1939. p.275,299.

Reclamation. (Cont'd).

Santee-Cooper project, South Carolina. By Kenneth Markwell. Civil engineering. v.9,no.7. July, 1939. p.395-398. State public service authority begins construction of multi-purpose river development 180,000-kva power plant and inland waterway are principal features.

Refrigerants.

Cooling without ice. Trained nurse and hospital review. v.103,no.1. July, 1939. p.69. Freezing powder is now on market that will be of invaluable aid to nurses working without ice or refrigeration facilities. It is actually two powders, which like Seidlitz powder need to be mixed together with water. Resulting solution is at once chillingly cold and remains so for from 20 to 25 minutes. After that its cold properties are renewed by addition of little more powder. There are two different mixtures. First is known as medicinal unit to be used for cold applications, ice bags, first aid emergencies. Second unit is household unit, much colder than first, averaging approximately 10 degrees above zero. Cost is moderate, and this non-poisonous powder keeps long without deterioration.

Refrigeration.

Effect of temperature on the rate of deterioration of fresh vegetables. By Hans Platenius. Journal of agricultural research. v.59, no.1. July 1, 1939. p.41-58. Generally, lowering of storage temperature has resulted in considerable lengthening of storage life of particular vegetable, provided temperature was not so low as to cause injury from freezing or chilling.

Factors to be considered in the evaluation of food freezing methods. By Wm. J. Finnegan. Ice and refrigeration. v.96,no.5. May, 1939. p.429-432.

Freezing storage of figs. By H. M. Reed. Ice and refrigeration. v.96,no.5. May, 1939. p.425-426. Investigations on possibilities of frozen pack are part of program to increase number of products from Magnolia figs for purpose of increasing consumption. Some of results of this work are given.

Refrigeration on the farm grows important. Market growers journal. v.64,no.12. June 15, 1939. p.304.

Refrigeration on Cars, Trucks, etc.

Altek system of refrigerated transport in Europe. By M. T. Zarotschenzeff. Ice and refrigeration. v.96,no.4. April, 1939. p.285-288. Illustrated description of the "Altek" system of mechanical refrigerated transport, as used in European Countries. Construction and operating features.

Refrigeration on Cars, Trucks, etc. (Cont'd).

Altek system of refrigerated transport in Europe. By M. T. Zarotschenzeff. Ice and refrigeration. v.96,no.5. May, 1939. p.374-378. Illustrated description of the "Altek" system of mechanical refrigerated transport, as used in European countries. Construction and operating features.

New welded-riveted refrigerator car. Ice and refrigeration. v.96,no.6. June, 1939. p.508. New developments incorporated in design include steel ends with extra long corrugations extending around body and posts, steel doors of increased rigidity, new design of underframe having integral all-welded construction, also ice bunker, ice hatch, removable steel bulk-head, unique and very efficient application of insulation and new and economical method of using dry-ice in combination with water ice.

Refrigerator Lockers.

Design and cost of locker plants. By W. E. Guest. Ice and refrigeration. v.96,no.5. May, 1939. p.437.

New interest in cold storage lockers. Utah farmer. 59th year. June 25, 1939. p.3,15.

Refrigerated locker storage a fast growing and profitable business. By Ralph Winslow. Southern power and industry. v.57,no.8. August, 1939. p.36-39. Locker storage plant may be operated profitably either as a separate business or in connection with ice plants, dairies or creameries.

Regulators.

Remodelling Upper Chenab Canal head regulator 1936-37. By C. L. Handa. In Minutes of proceedings of the Punjab engineering congress, Lahore, 1938. Lahore, Mufid-I -'Am press, 1939. p.37-52h.

Siphons as water-level regulators: discussion. By A. Griffin and others. American society of civil engineers. Proceedings. v.65,no.2. February, 1939. p.365-370.

Research.

Cooperative research and demonstration in the Tennessee Valley area. Experiment station record. v.80,no.4. April, 1939. p.433-437.

Ethyl gasoline corporation builds big San Bernardino engineering laboratory. Implement record. v.36,no.6. June, 1939. p.26.

The federal government and research. By A. A. Potter. Mechanical engineering. v.61,no.5. May, 1939. p.376-378.

Research. (Cont'd).

Research in industry. By Frank B. Jewett. Scientific monthly. v.48,no.3. March, 1939. p.195-202.

Research laboratories planned for new agricultural development. Food industries. v.11,no.5. May, 1939. p.264-265. Government undertakes to speed up industrial uses of agricultural materials by big Federal research program.

Reservoirs.

Storage reservoirs on Snake river. Reclamation era. v.29,no.4. April, 1939. p.90-91.

Rivers.

Columbia river between Vancouver and the Dalles. By Theron D. Weaver. Military engineer. v.31,no.176. March-April, 1939. p.91-95.

Yellow River problem: discussion. By J. W. Beardsley and Elliott J. Dent. American society of civil engineers. Proceedings. v.65,no.3. March, 1939. p.550-558.

Yellow River problem: discussion. By Herbert Chatley and H. van der Veen. American society of civil engineers. Proceedings. v.65,no.4. April, 1939. p.707-715.

Yellow River problem: discussion. By C. S. Jarvis and E. W. Lane. American society of civil engineers. Proceedings. v.65,no.6. June, 1939. p.1069-1077.

Runways and Tracks.

Building a cinder running track. By John J. Mundinger. Public works. v.69,no.12. December, 1938. p.20-21.

Low-cost airport runway. By A. M. Miller. Engineering news-record. v.122,no.1. January 5, 1939. p.31-32.

Scour.

Protection against scour below river and canal works. By H. L. Uppal and N. N. Bhandari. In Minutes of proceedings of the Punjab engineering congress, Lahore, 1938. Lahore, Mufid-I-'Am press, 1939? p.107-152w.

Silage.

Grass silage in agriculture. By C. B. Bender and E. S. Savage. Hoard's dairyman. v.84,no.10. May 25, 1939. p.312,325. Grass silage is silage made from any uncured hay crop--whether it be a true grass such as timothy, a legume such as alfalfa, or a green cereal such as oats. Terms like "alfalfa-molasses silage" or "timothy-phosphoric acid silage" describe specific kinds of grass silage.

Silos.

Cast-in-place concrete silos. Concrete. v.47,no.6. June, 1939. p.23,27. Table gives sizes and spacing of horizontal reinforcing bars in concrete silos of cast-in-place type intended for grass silage.

Silo pressure and temperatures with corn and grass silage. By J. R. McCalmont and H. E. Besley. Agricultural engineering. v.20,no.6. June, 1939. p.227-230. Summary: 1. Corn silage put up in late milk or early dent stage when moisture content ranges from 68 to 72 per cent was found to exert lateral pressures of 8 lb and vertical pressures of 5 lb per sq ft for each foot of depth in silos of 14-ft diameter. 2. Corn silage in 18-ft silo with 74 percent average moisture exerted lateral pressures up to 14 lb and vertical pressures of about 8 lb per sq foot of depth. 3. Grass silage put up with molasses exerted lateral pressures of 19 lb or more and vertical pressures of from 6 to 9 lb per square foot per foot of depth when placed in 18-ft silo with not more than 72 per cent average moisture, or in 12-ft silo with not more than 80 per cent moisture. 4. Moisture content of silage and diameter of silo affects amount of lateral and vertical pressures. Further tests must be run to show effect each has on pressures. 5. Temperatures in low-moisture grass silage are apt to go high enough to spoil silage unless special measures are taken to exclude air, such as applying weights of about 40 lb per sq ft to top of silage.

Silos for legume and grass silage. Hoard's dairyman. v.83,no.9. May 10, 1939. p.286-287,301. Concrete stave silos. Cast-in-place concrete silos. Resurfacing concrete silo walls. Protective treatments for concrete silo walls.

Story of the silo. Wisconsin agriculturist and farmer. v.66,no.12. June 17, 1939. p.10.

Temporary silo is easily built. Oregon farmer. v.62,no.11. May 25, 1939. p.5. Temporary silos are of two principal types. One is trench silo and other is made from snow fencing and sisalkraft paper.

Trench silo. By J. E. Stanford. Southern agriculturist. v.69,no.5. May, 1939. p.9.

Silt.

River problems in Bengal. By S. C. Majumdar. Indian engineering. v.105,no.6. June, 1939. p.204-212. Silt, the dominating factor.

Theory of silt transportation: discussion. By S. G. Bauer. American society of civil engineers. Proceedings. v.65,no.3. March, 1939. p.463-464.

Transportation of sand and gravel in a four-inch pipe: discussion. By H. S. Gladfelter. American society of civil engineers. Proceedings. v.65,no.3. March, 1939. p.460-462.

Silt. (Cont'd).

Transportation of sand and gravel in a four-inch pipe: discussion. By G. W. Howard. American society of civil engineers. Proceedings. v.65,no.6. June, 1939. p.1011-1015.

Snow Surveying.

How much snow? By Myron M. Stearns and Blaine Stubblefield. Scientific American. v.160,no.3. March, 1939. p.150-152. New science of snow surveying. Quantity of snow in the mountains determines later run-off below. Knowledge is vital for power plants, irrigation.

Soil Mechanics.

Soil mechanics. By Karl von Terzaghi. Engineering. v.147, no.3826. May 12, 1939. p.566-568.

Soil Stabilization.

Soil stabilization. By Bernard E. Gray. Military engineer. v.31,no.176. March-April, 1939. p.99-106. Discusses some of principal methods employed whereby stabilized soil condition is had sufficient to resist atmospheric changes and to carry the heaviest loads now coming upon highways and airports.

Soils.

Fertility program for celery production on everglades organic soils. By J. R. Beckenbach. Gainesville, Fla., 1939. 39p. University of Florida. Agricultural experiment station. Bulletin no.333.

Stairways.

Entrance halls and stairways illustrated by examples from Massachusetts and central New England. Pencil points. v.20,no.4. April, 1939. p.247-260.

Standards.

Protective standards of the Federal Housing Administration. By Seward H. Mott. Civil engineering. v.9,no.5. May, 1939. p.289-290. Explains function of FHA as mortgage insurance company and details conditions under which it executes mortgages. Also explains important rôle played by zoning and restrictive covenants in making sites eligible for acceptance.

Steel.

Study of temperatures under sheet steel roofs. By Henry Giese and others. Agricultural engineering. v.20,no.7. July, 1939. p.267-270. Arrangement became operative between Iowa Agri-

Steel. (Cont'd).

cultural experiment station and Republic Steel corporation, for purpose of initiating study to investigate past and present uses of steel in farm construction, to find wherein they may have failed to produce satisfactory results, and to attempt to devise improvements which will result in better performance.

Sterilization.

Solved by dairymen. By Wallace George. Electricity on the farm. v.12,no.7. July, 1939. p.7. 100 controlled steam sterilizers in use in Duke power territory in North Carolina. Completely automatic--They sterilize, dry and store utensils in sanitary atmosphere. As cheap as coal.

Utensil sterilization. By Harvey Burns. Electricity on the farm. v.12,no.7. July, 1939. p.6,12. Electric steam accumulator meets all inspection requirements; dirt and labor eliminated and operating expense is reasonable.

Storage of Farm Produce.

Fruit handling and storage investigations. By F. W. Allen. Ice and refrigeration. v.96,no.6. June, 1939. p.451-453. Carbon dioxide storage--waxing process--a progress report.

Household storage of fruits and vegetables. By R. E. Robinson. Ottowa, Canada, 1938. 8p. Dominion of Canada. Department of agriculture. Circular no.138.

How long do vegetables store? Market growers journal. v.64,no.12. June 15, 1939. p.304-306. Table gives storage requirements of some common vegetables.

Strains and Stresses.

Strength of some reinforced brick masonry beams in bending and in shear. By F. G. Thomas and L. G. Simms. Structural engineer. v.17, (New series),no.7. July, 1939. p.330-346. Few tests have been made at Building Research Station on short span reinforced brick masonry beams, such as might be used for lintels, and results are thought to be of sufficient interest to justify publication, even though investigation by itself is not comprehensive enough to warrant any definite pronouncement as to reliability of this form of construction under all practical conditions.

Structural significance of stress. By Bruce Johnston. Civil engineering. v.9,no.5. May, 1939. p.291-294. What is the relation between stresses in a ductile material and yielding of the material? What is relation between yielding of material and failure of an engineering structure? What is true concept of "factor of safety"? What factors influence "useful limit" of a structure under static load? Finally, what is relation between these factors

Strains and Stresses. (Cont'd).

and everyday problem of design? Professor Johnston, in correlating what is known about these questions from the viewpoint of their application to structural engineering practice, makes a helpful contribution to the interpretation of current structural research.

Surveying.

Organization of TVA surveying and mapping activities. By Ned H. Sayford. Civil engineering. v.9,no.8. August, 1939. p.473-476.

Sweet Potatoes.

Sweet potatoes as raw material. By H. S. Paine and others. Chemical and metallurgical engineering. v.46,no.2. February, 1939. p.69-71. References: p.71. Means that have been taken to preserve potatoes so that production of starch could be maintained over a 12-month period and to lower cost to manufacturer is story that has real significance for numerous industries using agricultural commodities as their starting material.

Tanks, Concrete.

Design of circular concrete tanks. By George S. Salter. American society of civil engineers. Proceedings. v.65,no.3. March, 1939. p.419-428. Object of paper is to present rigorous mathematical design analysis of circular concrete tanks that is accurate for shallow tanks of rather large diameters, such as are used for settling purposes, as well as for deeper tanks of small diameter. It is shown that, by fixing wall at base so that liquid pressure is divided between circular rings and vertical cantilevers, magnitude of maximum ring tension is greatly reduced. For tanks of proportions such as are ordinarily used for settling purposes maximum ring tension amounts to only about one-quarter to one-third, and total amount of wall reinforcement to less than one-half of that required were wall free at base. Diagrams are presented to facilitate design and example is given showing their application.

Design of circular concrete tanks: discussion. By Carl A. Rosengarten and I. K. Silverman. American society of civil engineers. Proceedings. v.65,no.5. May, 1939. p.907-910.

Design of circular concrete tanks: discussion. By Frank J. McCormick and others. American society of civil engineers. Proceedings. v.65,no.6. June, 1939. p.1115-1129.

Terracing.

Closed level terraces--no run-off in 12 years. By R. E. Dickson and others. Soil conservation. v.4,no.11. May, 1939. p.262-263. Table gives run-off, yields, and market values of cotton from terraced and unterraced areas.

Textile Fibers.

Report on development and use of rayon and other synthetic fibers. By D. F. J. Lynch and others. Washington, U. S. Bureau of chemistry and soils, 1938. 50p. mimeographed.

Tires.

Designing the tire for the car. By E. A. Roberts. S. A. E. journal. v.44,no.6. June, 1939. p.243-251. Paper presents comprehensive review of tire design and development. Functional units of tire are taken up one by one--body plies, tread plies, cushion, bead wire, reinforce, chafers, sidewall, and tread. Fundamental factors that affect tire service are discussed, such as load, inflation, speed, and atmospheric temperature, as well as neglect, abuse, horsepower, and road surface. Author also considers various types of tire failures; graphic method of measuring tread movement; tire development and improvement; costs; and tailoring tire to car.

Farm machinery rolls on rubber around the globe. By Warren S. Lockwood. Implement record. v.36,no.8. August, 1939. p.15-16,49.

Farming of tomorrow on rubber. By Harold Smith. Farm implement news. v.60,no.13. June 29, 1939. p.24.

Farming "on rubber". By J. G. Kreyer. Farm machinery and equipment. No.1865. May, 1939. p.20. Special uses of agricultural tractor tires.

Old tires sweep up stalks in sugar-cane field. Popular mechanics magazine. v.70,no.6. December, 1938. p.861.
In sugar-cane fields of Hawaii new use has been found for old automobile tires. Split in half and given "teeth" by deep notches, tires are mounted behind farm tractor in such a way that they are self-rotating when dragged across field. Thus each pair of tires, driven over dead leaves and stalks of cane, sweeps this refuse into windows where it is easily collected for final disposition. One man, operating two-row "sweeper", can clean up ten acres in a day.

Pneumatic tractor tire profile studies. By R. H. Wileman. Agricultural engineering. v.20,no.6. June, 1939. v.231-232. Table 1.--Data for two and three-plow tractors with various wheel equipment pulling plows. Table 2.--Seedbed preparation--three-plow tractor pulling 10-ft tandem disk and 10-ft soilpacker.

Rubber on Pacific coast farm machines. By F. Hal Higgins. Implement record. v.36,no.8. August, 1939. p.17-18.

Rubber tired machinery on orchard and farm. By R. B. Gray. Implement record. v.36,no.8. August, 1939. p.13-14,48.

Rubber tired tractors reduce fuel costs. By J. B. Torrance. Agricultural leaders' digest. v.20,no.4. May, 1939. p.14.
Increased speed, larger percentage of power delivered to drawbar,

Tires. (Cont'd).

and lower fuel consumption per unit of work are cited by University Farm engineering authorities as proved advantages to users of rubber-tired tractors.

Rubber-tyred tractor tests. Implement and machinery review. v.65,no.770. June 1, 1939. p.181-182.

Tire design factors influencing control of vibration. By E. S. Ewart. S. A. E. journal. v.44,no.1. January, 1939. p.43-48. Section 1.

Tires for tractors and tools...and implement dealer. By P. W. Stansfield. Implement record. v.36,no.8. August, 1939. p.19-20.

Tractors are rubber-tired to give more pulling power. National petroleum news. v.31,no.24. June 14, 1939. p.34-35.

Tractors.

Caterpillar tractor. By Roy L. Havens. Magazine of wall street. v.63,no.13. April 8, 1939. p.718-721.

Neglect: the enemy of tractor life, destroyer of service reputation, cause of excessive expense. By C. E. Packer. Implement and tractor. v.54,no.7. April 1, 1939. p.20-21,31.

New method of grouping tractors is suggested. By J. B. Torrance. Implement and tractor. v.54,no.16. August 5, 1939. p.18.

Traction of farm tractors. By J. B. Torrance. Implement and tractor. v.54,no.7. April 1, 1939. p.14,48.

Tractor engine's efficiency depends on its spark plugs. National petroleum news. v.31,no.24. June 14, 1939. p.38-39. Right type of plug, in good condition, promotes combustion efficiency, aiding complete utilization of fuel. Occasionally, tractor fuel is blamed for engine trouble when real cause is faulty spark plug.

Tractor industry. Implement and machinery review. v.64,no.766. February 1, 1939. p.1011-1012. "A new technique". Changing basis of operations. Different views on economical power application.

Tractor industry. Implement and machinery review. v.65,no.769. May 1, 1939. p.64. Latest trends in design--power and speed--changing ideas.

Tractor industry. By W. J. West. Implement and machinery review. v.64,no.768. April 1, 1939. p.1235-1236. Row-crop work. Root hoeing problems. Front or rear toolbars.

Tractors. (Cont'd).

Tractors on small farms open new market for oil. National petroleum news. v.31,no.24. June 14, 1939. p.25-28. Recent developments in tractor manufacturing, especially new low-cost one-plow tractor which comes within purchasing power of small farms, promises to add billion gallons within next few years to oil industry's already large farm market. Article analyzes extent of farm tractor market for fuels, lubricants, spark plugs and tires.

Tractors or horses. By Alden P. Tuttle. New England homestead. v.112,no.10. May 20, 1939. p.9. Tractors possess many definite advantages over horses: (1) They do work faster and better. (2) They are more reliable and dependable than horses especially with modern help which is familiar with automotive machinery but knows nothing about horses. (3) They can be driven safely and rather expertly by ordinary help. (4) They do not soften up when idle. (5) They are not affected by heat or cold, and, if necessary, can work all night as well as all day. (6) They don't eat when they don't work. (7) They require less attention than horses when working and need no attention when idle. (8) They require less room to house and much less expensive buildings can be used to house them. (9) They can be locked up in barn for a week-end or longer when the owner and his family take a vacation and not require any one to tend them night and morning during this time. (10) They do belt as well as field work. (11) They can operate power sprayers or dusters on power take off, thus saving expense of one motor. (12) They last longer with good care.

Tung Oil.

Economic value of tung oil--a national viewpoint. By C. C. Concannon. Paint, oil and chemical review. v.101,no.10. May 11, 1939. p.20-26.

Tung oil research as aid to new southern industry. By Henry G. Knight. Paint, oil and chemical review. v.101,no.9. April 27, 1939. p.5-6,19.

Waste Products.

Cost evaluation of bagasse for industrial utilization. By E. A. Gastrock and D. F. J. Lynch. Facts about sugar. v.34,no.6. June, 1939. p.37-39. Method for calculating equivalent fuel values and costs of bagasse in relation to other fuels.

Water, Underground.

Percolation and capillary movements of water through sand prisms. By F. T. Mavis and Tsung-Pei Tsui. Iowa City, Ia., 1939. 31p. University of Iowa. Studies in engineering. Bulletin no.18.

Water conduction from shallow water tables. By R. E. Moore. Hilgardia. v.12,no.6. March, 1939. p.383-426. "Literature cited": p.425-426.